PROCEEDINGS OF SCIENCE

Influence of quantum matter fluctuations on the expansion parameter of timelike geodesics

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During this talk, we shall discuss the passive influence of quantum matter fluctuations on the expansion parameter of a congruence of timelike geodesics in a semiclassical regime. In particular, we shall see that the perturbations of this parameter can be considered to be elements of the algebra of matter fields at all perturbative order. Hence, once a quantum state for matter is chosen, it is possible to explicitly evaluate the amplitude of the geometric fluctuations. After introducing the formalism necessary to treat similar problems, we estimate the approximated probability of having a geodesic collapse in a flat spacetime due to those fluctuations. Starting from this, some estimate of the spacetime uncertainty relations will be given.

References

[1] N. Drago, N. Pinamonti *"Influence of quantum matter fluctuations on geodesic deviation"*, Preprint February (2014) [1402.4265 [math-ph].

[2] N. Pinamonti, D. Siemssen *"Global Existence of Solutions of the Semiclassical Einstein Equation in Cosmological Spacetime"*, Commun. Math. Phys. Accepted for publication. (2014) [1309.6303 [math-ph].

[3] N. Pinamonti, *"On the initial conditions and solutions of the semiclassical Einstein equations in a cosmological scenario"*, Commun. Math. Phys. **305** (2011) 563-604.

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